

CLAIMS

1. An ultrasonic diagnostic apparatus obtaining plural ultrasonic tomographic images at a process that an ultrasonic probe moves and scans within a body cavity of a body to be examined, the apparatus comprising:

position information detecting means for detecting position information of plural ultrasonic tomographic images obtained in a process that the ultrasonic probe moves within a body cavity of a body to be examined; and

tomographic parallel images constructing means for constructing plural tomographic parallel images arranged along a scan path of the ultrasonic probe based on the position information obtained by the position information detecting means.

2. The ultrasonic diagnostic apparatus according to Claim 1, further comprising display control means for causing display means to display the ultrasonic tomographic image and the tomographic parallel images so as to compare.

3. The ultrasonic diagnostic apparatus according to Claim 1, wherein the tomographic parallel images constructing means constructs new tomographic parallel images by overwriting pixels corresponding to the tomographic parallel images with the pixels corresponding to the ultrasonic tomographic image every time when the ultrasonic tomographic image is created in the process that the ultrasonic probe

moves and scans within a body cavity of a body to be examined.

4. An ultrasonic diagnostic apparatus obtaining plural ultrasonic tomographic images in a process that an ultrasonic probe moves within a body cavity of a body to be examined, the apparatus comprising:

position and direction detecting means for detecting positions and directions of plural ultrasonic tomographic images; and

tomographic parallel images constructing means for constructing tomographic parallel images arranged along a scan path based on the positions and the directions.

5. The ultrasonic diagnostic apparatus according to Claim 4, further comprising display means displaying the ultrasonic tomographic image and the tomographic parallel images so as to compare them.

6. The ultrasonic diagnostic apparatus according to Claim 5, wherein the display means displays the ultrasonic tomographic image and the tomographic parallel images on one screen so as to compare them.

7. The ultrasonic diagnostic apparatus according to Claim 5, wherein the display means displays on the tomographic parallel images an ultrasonic tomographic image marker indicating a position of the ultrasonic tomographic image.

8. The ultrasonic diagnostic apparatus according to Claim

7, further comprising ultrasonic tomographic image marker setting means for setting a position of the ultrasonic tomographic image marker, wherein the display means selects and displays the ultrasonic tomographic image in accordance with a position of the ultrasonic tomographic image marker set by the ultrasonic tomographic image marker setting means.

9. The ultrasonic diagnostic apparatus according to Claim 4, further comprising slicing means for slicing the ultrasonic tomographic image and creating slices of the ultrasonic tomographic images, wherein the tomographic parallel images constructing means constructs tomographic parallel images by arranging the slices.

10. The ultrasonic diagnostic apparatus according to Claim 9, further comprising slicing position setting means for setting a position of slicing the ultrasonic tomographic image, wherein the slicing means slices an ultrasonic tomographic image at a position set by the slicing position setting means and creates slices thereof.

11. The ultrasonic diagnostic apparatus according to Claim 4, further comprising rotating means for constructing new tomographic parallel images which are resulted from rotation of the tomographic parallel images.

12. The ultrasonic diagnostic apparatus according to Claim 4, wherein the display means displays the tomographic parallel images and an indicator indicating a direction of

the tomographic parallel images with respect to the position and direction detecting means.

13. The ultrasonic diagnostic apparatus according to Claim 4, wherein the tomographic parallel images constructing means constructs new tomographic parallel images by overwriting the tomographic parallel images with pixels on the ultrasonic tomographic image every time when the ultrasonic tomographic image is created in a process that an ultrasonic probe moves within a body cavity of a body to be examined.

14. The ultrasonic diagnostic apparatus according to Claim 13, wherein the tomographic parallel images constructing means determines pixels to be overwritten based on the position and direction detected by the position and direction detecting means.

15. The ultrasonic diagnostic apparatus according to Claim 4, wherein the ultrasonic probe constitutes a mechanical radial scan type ultrasonic endoscope performing mechanical radial scanning.

16. The ultrasonic diagnostic apparatus according to Claim 4, wherein the ultrasonic probe constitutes an electronic radial scan type ultrasonic endoscope performing electronic radial scanning.

17. The ultrasonic diagnostic apparatus according to Claim 4, wherein the ultrasonic probe constitutes a capsule

ultrasonic endoscope.

18. The ultrasonic diagnostic apparatus according to Claim 4, wherein the ultrasonic probe constitutes a convex scanning type ultrasonic endoscope performing convex scanning.

19. An ultrasonic diagnostic apparatus moving an ultrasonic transducer within a body cavity of a body to be examined and creating plural chronological tomographic images in accordance with the movement, the apparatus comprising:

position information detecting means for detecting position information of the ultrasonic transducer when the tomographic images are obtained; and

auxiliary image creating means for creating an auxiliary image indicating position information of the tomographic images along a path of the movement of the ultrasonic transducer based on position information obtained by the position information detecting means and the tomographic images corresponding to the position information.

20. The ultrasonic diagnostic apparatus according to Claim 19, further comprising display control means for displaying the auxiliary image and a tomographic image corresponding to the auxiliary image so as to compare them.

21. The ultrasonic diagnostic apparatus according to Claim 19, wherein the auxiliary image creating means creates

the auxiliary image including a plate-like ultrasonic image marker expressing a position and direction of the tomographic image.

22. The ultrasonic diagnostic apparatus according to Claim 20, wherein the display control means causes display of the auxiliary image and a tomographic image corresponding to the auxiliary image on the same screen.

23. The ultrasonic diagnostic apparatus according to Claim 19, further comprising recording means for relating and recording the tomographic image and the position information,

wherein the auxiliary image creating means can create an auxiliary image indicating position information of the tomographic image based on the position information read from the recording means and the tomographic image corresponding to the position information.

24. The ultrasonic diagnostic apparatus according to Claim 20, wherein:

the auxiliary image creating means creates plural auxiliary images for indicating position information of the tomographic images from different directions; and

the display control means causes display of the auxiliary images on the same screen so as to compare them.

25. The ultrasonic diagnostic apparatus according to Claim 21, wherein the auxiliary image creating means creates

the auxiliary image by synthesizing the plural ultrasonic image markers and a locus marker of the ultrasonic transducer, which is created by sequentially connecting the ultrasonic image markers.

26. The ultrasonic diagnostic apparatus according to Claim 21, wherein the auxiliary image creating means superimposes a direction marker indicating a specific direction of a corresponding tomographic image on the ultrasonic image marker.

27. The ultrasonic diagnostic apparatus according to Claim 19, further comprising input means instructing changing a mode of displaying the tomographic image,

wherein the auxiliary image creating means creates an auxiliary image having the ultrasonic image marker displayed in a mode changed in connection with a change in mode of displaying the tomographic images.

28. The ultrasonic diagnostic apparatus according to Claim 19, wherein the auxiliary image creating means creates the auxiliary image including the plural ultrasonic image markers arranged along a path of movement of the ultrasonic transducer, and makes a display form of the ultrasonic image marker corresponding to the tomographic image displayed for comparison among the plural ultrasonic image markers different from a display form of the other ultrasonic image markers.

29. The ultrasonic diagnostic apparatus according to Claim 28, further comprising input means instructing changing a tomographic image to be displayed among the plural tomographic images recorded in the recording means,

wherein the auxiliary image creating means changes the ultrasonic image marker to a different display form in connection with a change in the tomographic image to be displayed.

30. The ultrasonic diagnostic apparatus according to Claim 20, wherein the auxiliary image creating means creates the auxiliary image including a marker indicating a coordinates system, which is a reference for creating the ultrasonic image markers.

31. The ultrasonic diagnostic apparatus according to Claim 30, further comprising input means instructing changing a direction of displaying the auxiliary image,

wherein the auxiliary image creating means changes a direction of displaying the auxiliary image as well as the marker indicating the coordinates system based on the instruction from the input means.

32. The ultrasonic diagnostic apparatus according to Claim 19, wherein the position information detecting means calculates the position information based on a coordinates system with reference to a body to be examined.